D0 CRYOGENIC CONTROLS

I/O BASE POWER DISTRIBUTION

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OVERVIEW: The D0 cryogenic control system has 3 I/O bases and 1 25 amp 24vdc power supply. Each I/O base uses both 120 vac and 24 vdc. There are as many as 14 modules in each base, depending on what type of module it may require ac or dc. Then there are as many as 32 devices(instrumentation) per module.

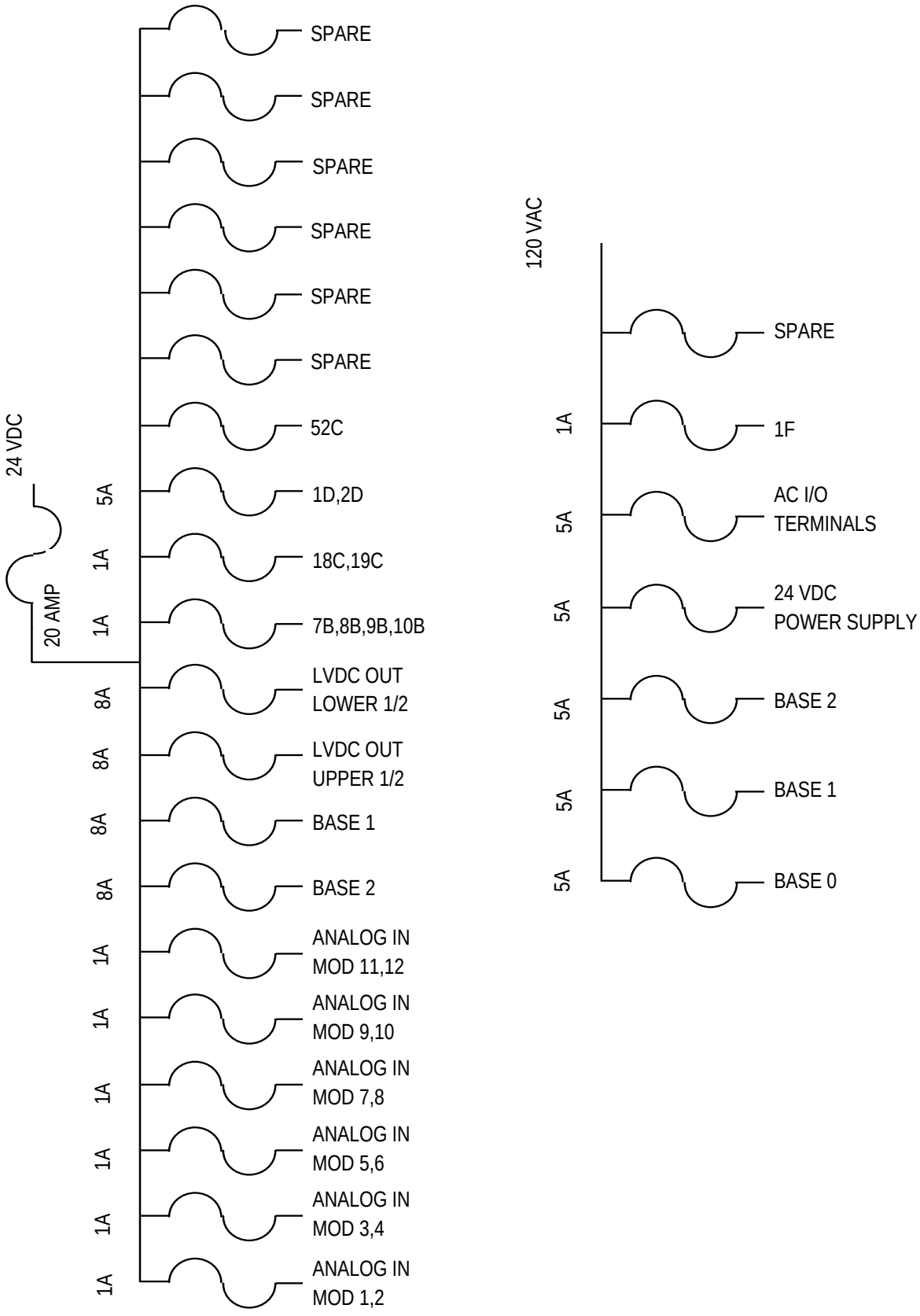
There is a power distribution network that provides power to this system. It was configured so that no conductors, devices, or components could carry or receive more current or voltage than they could safely handle. This is done to protect both personnel and components from fire, heat, and electric shock.

24 VDC POWER SUPPLY: The 24 vdc power supply picked is a constant voltage power supply capable of delivering 25 amps dc. This type of power supply was picked for its durability and the relatively trouble free operation it gives. There is one drawback however, upon startup they have a typical voltage overshoot of 8-10 volts. This was damaging to certain types of modules and caused them to blow their fuses on startup. To prevent this from happening a time delay was installed on the dc output of the power supply. The time delay is 1 or 2 seconds, but is long enough for the constant voltage transformer to respond and correct the output voltage before any current is delivered to the control system. There is a schematic of the time delay circuit contained in this engineering note.

POWER DISTRIBUTION: All 120vac power cords are 16 awg or larger. 120 vac is supplied from the U.P.S. , distribution panel #PP-D0-UPS circuit #2 or 4. The 120 vac is then split up to the different loads that use it. Each branch circuit uses a fuse and wire to deliver power compatible with the load according to the National Electric Code. Particular care was used where the 120 vac splits up into multiple paired cable of 22 0r 24 awg, to protect the amount of current that could be delivered to the wire.

The 24 vdc current is fused at the power supply with a 20 amp dc fuse. It then is split up into its branched circuits and then fused to match the individual requirements of that branch circuit and its current carrying conductors.

See attached fuse and layout diagram for individual specifications.


24 VDC
20 AMP
5A
1A
1A
8A
8A
8A
8A
1A
1A
1A
1A
1A
1A
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
52C
1D,2D
18C,19C
7B,8B,9B,10B
LVDC OUT
LOWER 1/2
LVDC OUT
UPPER 1/2
BASE 1
BASE 2
ANALOG IN
MOD 11,12
ANALOG IN
MOD 9,10
ANALOG IN
MOD 7,8
ANALOG IN
MOD 5,6
ANALOG IN
MOD 3,4
ANALOG IN
MOD 1,2
120 VAC
1A
5A
5A
5A
5A
5A
SPARE
1F
AC I/O
TERMINALS
24 VDC
POWER SUPPLY
BASE 2
BASE 1
BASE 0